

REMARKS:

Claims 1-37 are pending. By this Submission, claims 1-37 remain unchanged.

Claims 1-37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,948,353 ("Lawrence"). More particularly, the Examiner contends that Lawrence establishes a prima facie case of obviousness of claims 1-37.

Applicants wish to thank the Examiner for the in-office interview on August 8, 2006.

In the interview, Applicants presented evidence establishing that Lawrence does not establish a prima facie case of obviousness. The following is the evidence presented in the interview to rebut any argument of obviousness and affirmatively show patentability.

I. THE PRESENT INVENTION IS PATENTABLE OVER LAWRENCE

In the Office Action dated April 3, 2006, the Examiner states "one not concerned with fineness of microstructure or level of free ferrite would thus be motivated to reduce the tin content of the prior art composition." This statement implies that those skilled in the art of brake drums may not be concerned with fineness of microstructure and the level of free ferrite in compositions. To the contrary, Applicant and others skilled in the art of brake drums are very concerned with fineness of microstructure and the level of free ferrite in brake drums. This point was made in the interview and is stressed in ¶5 of the Second Declaration of Laxmi C. Tandon (hereafter, the "Second Declaration") submitted herewith. Lawrence and the present invention both obtain a fine microstructure and reduced free ferrite, but they obtain these results in different manners. Every composition of Lawrence includes Tin (Sn) to provide a fine microstructure and reduced free ferrite (Lawrence, Col. 3, Ins. 9-28), while the present invention includes a cooperative effect of Cu and Mo to provide a fine microstructure and reduced free ferrite WITHOUT using Sn. Since Lawrence uses Sn to achieve finer microstructure and reduced free ferrite, and Applicant does not and instead uses other means, Applicant's invention is not obvious from Lawrence.

Independent claims 1, 11, 18, 19, 20, and 34 include the language "consisting essentially of". As is understood, "consisting essentially of" refers to a composition that "includes the listed ingredients and is open to unlisted ingredients that do not materially affect the basic and novel properties of the invention". See *PPG Indus. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1354, 48 U.S.P.Q.2d 1351, 1353-54 (Fed. Cir. 1998). In other words, the composition is not open to

unlisted ingredients that materially affect the basic and novel properties of the invention. Independent claims 1, 11, 18, 19, 20, and 34 do not recite Sn. Lawrence teaches Sn in all its compositions. Sn would have an undesirable material effect on the properties of the present invention by decreasing its machinability. Second Declaration ¶5. The presence of Sn in Lawrence cannot be ignored or minimized. Accordingly, independent claims 1, 11, 18, 19, 20, and 34 patentably define over Lawrence.

The removal of Sn from Lawrence would not be obvious. As discussed above, it is often desired for compositions used in manufacturing brake drums and other gray iron products to have a fine microstructure and reduced free ferrite. In Lawrence, Sn facilitates compositions with fine microstructure and reduced free ferrite. Removing Sn from the compositions of Lawrence would remove the properties of fine microstructure and reduced free ferrite that Lawrence discloses for providing an acceptable composition for manufacturing brake drums. After raising these issues with the Examiner, the Examiner agreed that it would not be obvious to one of ordinary skill in the art to eliminate Sn from the disclosure of Lawrence, as is evidenced in the Interview Summary (copy enclosed) prepared by the Examiner on August 8, 2006.

For these reasons, Lawrence does not teach or suggest the subject matter of independent claims 1, 11, 18, 19, 20, and 34. Accordingly, independent claims 1, 11, 18, 19, 20, and 34 are allowable. Claims 2-10, 12-17, 21-33, and 35-37 respectively depend from independent claims 1, 11, 20, and 34 and are allowable for the same and other reasons as independent claims 1, 11, 20, and 34.

II. APPLICANT HAS REBUTTED A PRIMA FACIE CASE OF OBVIOUSNESS

Assuming for the sake of argument that the Examiner has presented a prima facie case of obviousness, a prima facie case of obviousness can be rebutted in a variety of manners including:

1. Inventive composition has unexpected results or substantially improved properties over cited referenceⁱ
2. Cited reference teaches away from the inventive composition^{i,ii}

ⁱ In re Soni, et al., 54 F.3d 746; 1995 U.S. App. LEXIS 10380; 34 U.S.P.Q.2D (BNA) 1684

ⁱⁱ In re Sujeet Kumar, et al., 418 F.3d 1361; 2005 U.S. App. LEXIS 17215; 76 U.S.P.Q.2D (BNA) 1048

3. Cited reference does not enable claimed subject matter of inventive compositionⁱⁱ

A. The Present Invention Has Unexpected Results or Substantially Improved Properties

The present invention has unexpected results or substantially improved properties over Lawrence. A brake drum believed to be made in accordance with the Lawrence patent was compared to a brake drum made in accordance with the present invention. With reference to ¶¶6-8 of the Second Declaration, the evidence shows that the Centrifuse® brake drum is manufactured from a composition disclosed in Lawrence. When the Centrifuse® and Applicant's brake drums were compared for wear after using them on truck axles, the brake drums of the present invention showed wear averaging 0.0057 inches as compared to wear on the Centrifuse® brake drums averaging 0.0157 inches. From this data, brake drums made according to the present invention have a projected life of more than 3 times that of the Centrifuse® brake drums (290,360 miles v. 88,960 miles).

Paragraph 9 of the Second Declaration refers to tests conducted on Centrifuse® brake drums prior to filing of the present patent application, and the results of these tests were referenced in Table 1 in the present patent application as "Sample G". The present invention is identified in Table 1 in the present patent application as "HT50". With reference to Table 1 of the present application, the present invention clearly outperforms the Centrifuse® brake drums with respect to the number of stops prior to failure (97 stops v. 16 stops) and the deceleration rate (19.91 ft/sec² v. 19.19 ft/sec²).

For these and other reasons, the present invention has unexpected results or substantially improved properties over Lawrence.

B. Lawrence Teaches Away From The Present Invention

Lawrence teaches away from the present invention for at least two reasons: 1) Lawrence teaches the use of Sn in all compositions, and the present invention does not utilize Sn and 2) Lawrence teaches a composite brake drum, while the present invention teaches a non-composite brake drum.

With regards to reason (1), reference is made to the remarks presented above in section I. If one were to follow Lawrence, a gray iron should include Sn to achieve a finer microstructure and reduced free ferrite. Lawrence col. 3, lines 9-28. Applicant achieves those benefits without the addition of Sn, and if one were to add Sn (0.02 to 0.07 weight % Sn as taught by Lawrence) to Applicant's composition, the result would be undesirable due to decreased machinability of the resulting composition. Second Declaration ¶5.

With regards to reason (2), Lawrence teaches a composite brake drum containing gray iron 14 and steel shell 12. Lawrence col. 3, lines 29-35. Although the purpose of the steel shell is not clearly stated by Lawrence, those skilled in the art of brake drums understand that the purpose of providing a steel shell (composite) on a brake drum is to provide a lightweight brake drum. The present invention accomplishes a lightweight brake drum without the use of a steel shell, and by avoiding the steel shell the Applicant's brake drums avoid the poor thermal conductivity, cracking, and chill effect problems of composite brake drums like Lawrence. Second Declaration ¶11. Accordingly, Lawrence teaches away from the brake drum of the present application by teaching the use of a steel shell.

For all these reasons, Lawrence teaches away from the present invention.

C. Lawrence Does Not Enable Claimed Subject Matter

Every composition of Lawrence teaches the use of Sn to create a fine microstructure and reduced free ferrite. In fact, Lawrence recites a conventional composition in the background section and at the top of column 4 that does not use Sn, and distinguishes over the conventional composition by the presence of Sn. Someone skilled in the art, following the teaching of Lawrence, would not be enabled to invent the claimed subject matter of the present invention.

CONCLUSION:

For the reasons set forth above and others, Lawrence does not establish a prima facie case of obvious of claims 1-37 of the present invention, and even if it does, Applicant has rebutted it.

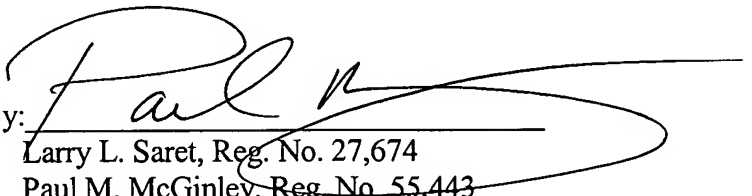
In view of the foregoing, allowance of claims 1-37 are respectfully requested.

The undersigned is available for telephone consultation during normal business hours.

Respectfully submitted,

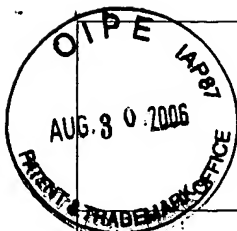
MICHAEL BEST & FRIEDRICH LLP

Dated: August 28, 2006

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Interview Summary

Application No.

10/685,097

Applicant(s)

TANDON ET AL.

Examiner

George P. Wyszomierski

Art Unit

1742

All participants (applicant, applicant's representative, PTO personnel):

(1) George P. Wyszomierski, examiner.

(3) Laxmi Tandon, inventor

(2) Paul McGinley, for Applicant.

(4) Larry Sorely for Applicant

Date of Interview: 08 August 2006.

Type: a) ☐ Telephonic b) ☐ Video Conference

c) ☒ Personal [copy given to: 1) ☐ applicant 2) ☒ applicant's representative]

Exhibit shown or demonstration conducted: d) ☒ Yes e) ☐ No.

If Yes, brief description: Applicant presented additional data showing strength of ~~inventive~~ inventive material

Claim(s) discussed: 1-37 versus some prior art embodiments

Identification of prior art discussed: Lawrence

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: _____

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

- 1) Applicant pointed out that Lawrence reference is to brake drum material with steel shell, whereas inventive material can form brake drums w/o steel shell.
- 2) Applicant indicated that combination of copper and molybdenum amounts in invention contribute to unexpected results vis-a-vis strength of material.
- 3) Applicant pointed out that the effects of tin suggested in Lawrence (fine microstructure, lack of free ferrite) are desirable in inventing ~~and that~~ It would not be obvious for one of skill in the art to eliminate the tin from Lawrence disclosure

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.


Examiner's signature, if required